

Public Health Chronicles

In this provocative and moving historical essay, Bateman-House asks questions that are as relevant today as they were 60 years ago: How do we protect the rights and moral beliefs of the individual against sometimes subtle, yet powerful, coercive pressures? What happens when the ostensibly humane values of public health come up against the realities of wartime national mobilization? As she forcefully illustrates through a look at voluntary participation in human experimentation during wars, when patriotism collides with our deepest human values, the question of what is and what is not free choice can become terribly ambiguous. Bateman-House asks: “How should constrained circumstances affect the way we think about the decision to enter into a research project? Is severely limited choice in and of itself coercive, or is there a spectrum of choosing where choice is limited?” Here, we learn both of the heroism of the conscientious objector and the subtle ways their patriotism and moral beliefs collided and coalesced during the “Good War.”

David Rosner, MPH, PhD, Contributing Editor

Ronald H. Lauterstein Professor of Sociomedical Science and History
Columbia University, Mailman School of Public Health, New York, NY

MEN OF PEACE AND THE SEARCH FOR THE PERFECT PESTICIDE: CONSCIENTIOUS OBJECTORS, THE ROCKEFELLER FOUNDATION, AND TYPHUS CONTROL RESEARCH

ALISON BATEMAN-HOUSE, MA, MPH

People serve as research subjects for numerous reasons, such as to receive medical services, to earn compensation, to fulfill course requirements, and to further knowledge. Given the history of research abuses in the United States—for example, the U.S. Public Health Service study of untreated syphilis (i.e., the Tuskegee Study), the Willowbrook hepatitis studies, and the Jewish Chronic Disease Hospital cancer experiments—bioethicists and regulatory officials seek to ensure that prospective subjects are protected from entering into a study unknowingly, unwillingly, or without fully comprehending the nature of their involvement and the benefits and risks of participation.

How should constrained circumstances affect the way we think about the choice to enter into a research project? In the U.S., this question most commonly arises with regard to the use of prisoners as research subjects. Given the circumstance of incarceration, how free and voluntary is a prisoner’s decision to join a research study? In grappling with the impact of constrained circumstances, it is instructive to recall a largely forgotten historical episode, the use of American conscientious objectors as research subjects during World

War II (WWII). Drafted into military service that they could not, on grounds of conscience, perform, conscientious objectors (COs) had limited options: serve in the military in a noncombatant capacity, perform alternative national service, or go to jail. Some of the COs who opted to perform alternative national service fulfilled their obligation by participating as research subjects. For these men, what was voluntary and what was compulsory were intertwined: registering for the draft was compulsory but, if drafted, one could—at least in theory—choose among noncombatant service, alternative service, or jail. Those COs who performed alternative service were able to choose from an array of work assignments; thus, becoming a “guinea pig” was voluntary, albeit within an involuntary situation. Perhaps the most unusual aspect of the use of American COs as experimental subjects during WWII was that the idea was proposed by those sympathetic to the plight of the COs.

This article describes what is believed to be the first study to use American COs as research subjects and explores why COs and their supporters were interested in participating in the research.

“WORK OF NATIONAL IMPORTANCE”: THE CPS PROGRAM

Under the Selective Training and Service Act of 1940, COs who were drafted were to be assigned to noncombatant military service or, if conscientiously opposed to such participation, to “work of national importance under civilian direction.”¹ This alternate service was to

be performed under the auspices of Civilian Public Service (CPS). Created through an executive order by President Franklin Roosevelt, CPS was a state-church hybrid, administered by the Selective Service but largely funded by the denominational organizations participating in the program.^{2,3} At that time, COs were defined as men whose opposition to military service arose from “religious training and belief;”¹ accordingly, the vast majority of those granted CO status were members of religions that espoused pacifism. The three religious groups most involved in the creation and administration of CPS were the Religious Society of Friends (commonly known as the Quakers), the Mennonite Church, and the Church of the Brethren.

In an early plan for CPS, participants were to be trained in war relief and rehabilitation services. At the completion of their training, participants would serve in war-torn areas overseas, providing humanitarian aid. However, political disfavor and accusations of favoritism to COs led the Selective Service to close the training programs. In the reoriented CPS, participants were housed in Civilian Conservation Corps camps (thus gaining the nickname “campers”), and each camp was affiliated with a governmental entity such as the Farm Security Administration, the U.S. Forest Service, Fish and Wildlife, the Bureau of Reclamation, the General Land Office, the National Park Service, and the Soil Conservation Service. Campers performed such tasks as ditch and dam building, tree planting, timber harvesting, surveying, road building, and fighting forest fires. The CPS camps existed from May 1941 to April 1947, during which time they accounted for approximately 12,000 COs.²

A number of instances were reported in which campers were assigned to work of doubtful urgency and questionable importance, often without the tools or training that would have allowed the work to proceed more efficiently. Many campers reviled their job assignments as “make-work,” and camp wits joked that CPS was engaged in “work of national impotence.”⁴ After numerous complaints on the part of the campers concerning the lack of meaningful work assignments—and bowing to pressure from civilian and state agencies that were facing a critical wartime shortage of manpower—the Selective Service agreed to form units that worked with rural public health programs, mental hospitals, and juvenile delinquent training schools.

WAR AND TYPHUS: THE LOUSE LAB

During WWII, disease outbreaks were a major concern to both Allied and Axis nations. Typhus, a bacterial disease transmitted by the feces of the human body louse,

had been a major problem during WWI.^{5,6} As a second world war became increasingly probable, the interest in typhus research escalated, and typhus prevention and control was considered an urgent defense need. Humanitarian organizations likewise were interested in typhus prevention and control due to the disease’s impact on civilian refugees.

In 1940, the Rockefeller Foundation foresaw the reemergence of typhus in Europe and Asia. Preparing for the anticipated humanitarian crisis, the Rockefeller Foundation approved “the inclusion of typhus fever in the International Health Division’s program for the control and investigation of specific diseases and deficiencies.”⁷ The foundation earmarked \$5,000 for typhus-related research, and an International Health Division (IHD) staff member went to Harvard Medical School to study under a researcher who had recently made advances in the development of a typhus vaccine.

Within the year, the Rockefeller Foundation decided to expand its typhus-related activities. With no vaccine yet available, typhus prevention targeted the lice that spread the disease; however, disinfestation techniques used at the time were unsatisfactory, as they offered no protection against reinfestation and were difficult and expensive to implement in the field.^{8,9} Chemical lousicides were difficult to use and frequently toxic to humans. A recommendation was made that the IHD “extend its present program of typhus studies to include field investigations of all types of typhus control” and increase its typhus research staff “to include such clinicians, epidemiologists, entomologists, and engineers as may be necessary to carry out field investigations of the most pressing problems.”⁹

On February 11, 1942, Dr. Wilbur A. Sawyer, Director of the IHD, approved the creation of a laboratory devoted to the study of louse control.^{10,11} The lab was to be housed at the Lower East Side District Health Building at 341 East 25th Street in New York City, a location selected in part due to the “ample sources of lice available, especially in the municipal flophouses of the lower East Side.”¹² Dr. William A. Davis, newly hired from the Johns Hopkins School of Hygiene and Public Health, and Charles M. Wheeler, an entomologist, were selected to head the laboratory’s louse-control study.¹³ The louse-control program had two research tasks: (1) to study the biology of the louse and (2) to devise a means of killing lice and preventing infestation.¹⁴ A major component of the second research focus was investigation of the insecticidal properties of various chemical substances.

WWII brought the Rockefeller Foundation into alliance with the war-related agencies of the federal

government.¹⁵ One area of collaboration was the testing of insecticides and repellants. Under the auspices of the federal Office of Scientific Research and Development, the Department of Agriculture's Bureau of Entomology and Plant Quarantine in Orlando, Florida, was charged with testing insecticides.¹⁵ Within days of creating the Louse Lab, the IHD director contacted the Department of Agriculture to broker a collaboration between the Orlando group and the Louse Lab.¹⁶

Before beginning its work on louse control, the Louse Lab needed to obtain a supply of lice. The severe infestation of the clothing of a patient admitted to Bellevue's alcoholic ward provided an ample supply of louse eggs, which were incubated and hatched.¹⁴ Body lice feed upon human blood, so the lice were sustained by feeding on five New York University medical students, each of whom spent one to two hours daily at the lab with the lice placed on their bodies. Over time, the lab obtained a collection of several thousand human lice in various stages of maturation.

The Louse Lab's field trials of anti-lice powders were first attempted with "Bowery bums."¹⁴ The Bowery, the most famous skid row in the United States, had a substantial number of homeless individuals, and it was to this population that Davis turned for experimental subjects.¹⁷ On June 15, Davis reported that he had gone to the 25th Street Municipal Lodging House and "engaged" 10 of the residents for two weeks, at a salary of \$7 for the period.¹⁸ Noting that three of the 10 men were "already lightly infested" with lice, he planned to establish lice on all of the men. Five would serve as controls, while the other five would apply experimental anti-lice powders. The men were not to take baths or wash their clothes for two weeks. Nightly, Davis would count the number of lice on the men's clothing.

Davis quickly encountered problems. An interoffice memo reported "considerable difficulty in securing suitable subjects." The men Davis had hired were deemed "very unreliable and some of them not at all cooperative."¹⁹ While convenient, these men were not optimal research subjects for the Louse Lab's purposes.

"MUCH MORE WILLING TO COOPERATE": COs AS RESEARCH SUBJECTS

Dismayed that CPS had been reoriented from relief work to manual labor, and saddled by the campers' complaints, the program's backers were intrigued to learn that some British COs were serving as research subjects. An article entitled "British Conchies Starve and Thirst in Experiment Seeking Way to Relieve Agony of the Shipwrecked" in the June 1, 1942, issue of *Newsweek* spoke approvingly of the "abundance of

merit" demonstrated by those participating in the "heroic experiment," and informed readers that the "risky ordeals of the anonymous conchies bring them army private's pay, and they suffer discomforts second only to those of active service."²⁰ The experiment that provided the bulk of material for the *Newsweek* article was one in which 12 COs and a researcher abstained from water to develop survival guidelines for shipwrecked sailors. The article briefly mentioned other research conducted on British COs, including a study of experimental scabies infestation.²¹

In the weeks following the publication of the *Newsweek* article, Paul Comly French, the Executive Secretary of the National Service Board for Religious Objectors (NSBRO)—an umbrella organization for religious groups involved with CPS—composed a letter to Dr. Thomas Parran, the Surgeon General of the United States and a Scientific Director of the Rockefeller Foundation's IHD. French wrote:

The conscientious objectors in England on several recent occasions have volunteered to be used as "guinea pigs" in various medical experimentations under the direction of the British Ministry of Health. It has occurred to me that there might be opportunities for some of the men in our C.P.S. Camps to volunteer for such service here. If you have any experimental work in mind in which this type of service would be helpful, we would be glad to have some word from you so that we might line up volunteers for your consideration.²²

French forwarded a copy of this letter to the Chief of the Camp Operations Division of Selective Service, inquiring if "this sort of thing would be a line of service that men might engage in with value."²³

Ten days after French penned his letters, David Swift, a member of the American Friends Service Committee (AFSC)—one of the religious organizations instrumental to the creation and operation of CPS—met with the IHD's Dr. George Strode. Like Parran, Strode wore more than one hat. As an associate director of the IHD, it was to him that Davis had reported his plans to test insecticides on Bowery dwellers. Strode also served as a member of the National Research Council's Subcommittee on Tropical Diseases.^{24,25} The idea to use American COs as research subjects may, in fact, have originated with Strode, as he discussed this idea with a member of the AFSC on June 3, 1942.²⁶

As a result of this meeting, Strode suggested that Davis accompany Swift to a CPS camp to "investigate this possibility at first hand." It wasn't a moment too soon to identify a new population of research subjects: three days after Strode's and Swift's meeting, an internal IHD memo deemed the homeless men hired by Davis to be unsatisfactory research participants. The

memo went on to say, “Dr. Strode has discussed this matter with Mr. Swift of the Society of Friends, who . . . is of the opinion that the conscientious objectors would be much more willing to cooperate than persons making use of the municipal lodging houses.”¹⁹

Davis needed a more controlled environment for his study, which was being derailed by uncooperative research participants. The COs, who were isolated in a remote camp, seemed a more appealing subject population for a study in which individuals were expected to endure first infestation with lice and then the application of chemical powders.

Davis and Swift visited CPS Camp #32, in Campton, New Hampshire, on July 1, 1942. Davis reported back to the Rockefeller Foundation that the camp was the “best opportunity yet presented of testing the control of lice on human subjects.” A number of factors favored the plan. Trying to “find things for the men to do which are useful to society,” the camp’s director was eager to cooperate and “offered to furnish men for experiments on starvation or vitamin-deficient diets.” Furthermore, the director was willing to provide the researchers with use of “a side camp where the men are completely isolated from their fellows and the rest of the world.” Davis felt the necessary arrangements—transporting lice and the experimental “killing agents” from New York to Campton, supplying the volunteers with underwear, and supervising the experiment—could “all be made easily” and the project could get underway quickly.²⁷

Most importantly, the proposed experimental subjects were cooperative. Davis reported that volunteers were “willing to live . . . in complete isolation for 18 days, without changing or washing their underwear, clothing, or bedding. They are willing to be infested with clean lice and to try out any powders or sprays which we think safe for human trial in any manner or amount which we desire.”²⁷ The men also agreed to sign statements that they would not sue for damages. Unlike the homeless men, who had been paid a minimal fee, the campers would not be remunerated (although the Rockefeller Foundation would pay for a portion of the men’s expenses).

Davis perceived the campers’ willingness to volunteer as arising from a sense of altruism. He reported that the COs represented many types: some were “crackpots” but a “certain proportion are honest pacifists of high ideals and Christian beliefs eager to aid humanity.” Davis added, “The volunteers are practically all from this ‘good’ group.”²⁷

For his part, Swift reported to the NSBRO that the study was inherently humanitarian in intent. “Because all attempts to eliminate lice from European cities after

the last war proved ineffective, the Foundation is particularly anxious to discover whether this new method, more easily applied to the total population of a stricken city, is really effective in other than laboratory conditions.” The study design was intended to reproduce “to a certain extent the conditions under which the poverty stricken population in a European city might be living.” Swift noted that the experimental lice were free of disease, having been “carefully bred through several generations on healthy medical students.” He concluded that the project seemed “well worth the trial, both for the intrinsic value which may develop from this experiment and because cooperation with the Foundation may open the way at some future time to more extensive participation in their medical and reconstruction work.”²⁸

Davis’ account of the visit likewise dealt with the civilian and humanitarian implications of the proposed research. He reported, “I spoke to the entire camp of about 140 men. The talk touched on the problem of typhus after the last war, the louse as the vector of typhus, the problem of louse control in a civilian population, and the need to test out louse-killing substances in actual human trials.”²⁷

With both the Rockefeller Foundation and CPS’s religious sponsors in favor of the proposed study, Strode wrote to the Selective Service requesting permission to conduct a field study at the Campton CPS camp. Strode justified his request by explaining that the Subcommittee on Tropical Diseases of the National Research Council was promoting the development and testing of new insecticides and noted that the “armed forces of the United States are greatly interested in the studies . . . and the Surgeon General of the Army has requested the utmost speed in finding a satisfactory insecticide which can be employed with safety and efficacy by troops.” Furthermore, Strode explained that the Rockefeller Foundation was working cooperatively with the Department of Agriculture. Seeking to forestall possible objections to the proposed project, Strode stated that participation was not hazardous to the volunteers’ health, nor would it significantly reduce their work output. Furthermore, the Rockefeller Foundation would “make a financial contribution to the upkeep of the volunteers in proportion to the reduction of their earning capacity.”²⁹

The Selective Service quickly responded, granting permission to proceed with the experiment.³⁰ Permission for the study was also requested, and received, from the U.S. Forest Service, which was in charge of the camp’s work assignments.^{31,32} The Rockefeller Foundation Health Commission Scientific Directors’ committee approved a \$3,000 allocation for louse-control

studies in New Hampshire.³³ As all the pieces fell into place, Camp Campton's director wrote to Strode to inform him that the volunteers were ready and the side camp would begin on July 27. He concluded, "We are very happy to have this opportunity to aid your research and hope that you will call upon us in the future, no matter how dangerous the project may be."³⁴

CAMP LICEUM

As promised, on July 27, a temporary ("side") camp consisting of seven dormitory tents, a cook tent, and a dining tent was set up in Glencliff, New Hampshire, approximately 40 miles away from the base camp.³¹ The residents of the side camp—nicknamed "Camp Liceum" (and occasionally "Camp Lyceum")—worked eight and a half hours daily rebuilding a road that had been destroyed by flooding.^{31,35,36}

Louis Riehl, a Rockefeller Foundation entomologist, and Davis explained the rules of the experiment: no purposeful killing of lice, no changing or washing of underwear or bedding, and no removal of undergarments except for removal of undershirts necessitated by heat during the workday.³¹ Participants would be allowed to bathe or change outer clothing without restriction. The 32 volunteers then removed their undergarments and donned new sleeveless cotton jerseys and blue cotton shorts. Each pair of undershorts sported a patch containing lice eggs and between 50 and 100 adult lice (which had been bred at the Louse Lab and which fed on Dr. Davis during their journey to the camp).^{31,35,37} One of the volunteers recalled:

The first night was uncomfortable. The business of getting acquainted is often awkward, and possibly these laboratory-bred insects were just as embarrassed as were the campers. (It is hoped they slept better.) But, with few exceptions, there was no serious discomfort after that. The bites were no worse than those of the mosquito, and apart from a certain amount of uninhibited scratching in public, the men felt and behaved more or less normally.³⁵

Each man's clothing was examined daily and the number of lice counted was recorded for each volunteer. The researchers noted the location of the lice, their apparent age, and the condition of the subject. On August 5, Davis decided the average louse count was high enough to start testing the powders. Two men were not assigned to treatment groups due to their particularly variable lice counts. The remaining 30 subjects were ranked according to their August 5 lice counts, and then divided into six groups of five men. Davis assigned to each of the groups some individuals with high counts and some with low counts to have

equivalent groups. Once the treatment groups were determined, subjects were given a bottle containing 30 grams of their assigned powder and told, "Spread it over your entire underwear and the armpits and crotch of outer clothing; pay particular attention to seams and folds. The better you spread it, the less they bite!" Seven powders were tested; five, with numeric code names, were Rockefeller creations, while two, given alphabetical code names, came from the Department of Agriculture group in Orlando. Powder 47, which had no active ingredients, was a control. Powders 39, 45, 46, and 48 contained, among other ingredients, 0.8% 2,4 dinitro-o-cyclo-hexyl phenol; the compositions of powders YAT and NLE were not revealed.³¹

By the day following the powder application, Davis was already urging the IHD to follow this trial with others. Noting that the study "seems to be the nearest yet devised to actual field conditions, and it can be rigorously controlled and observed," Davis advocated using the COs to test other powders, "since we have not yet exhausted our own mixtures or those at Orlando."³⁸

The trial ended August 15, 1942. No group was deemed louse-free, as the men had immature lice or eggs that could result in reinfestation.³¹ YAT was associated with no problems, but the men treated with NLE developed scrotal irritation. The powders containing 2,4 dinitro-o-cyclo-hexyl phenol stained clothing a pale yellow.

A second field trial, involving 27 volunteers, began on August 24, 1942. Davis used the same infestation technique as before, and once again the subjects lived in the side camp. Many of the subjects from the first trial participated in the second trial.³⁷ The substances tested were powders 83 (control), 87, 94, 91, MYL, and spray P. Powders 87, 94, and 91 contained, among other ingredients, 2,4 dinitro-o-cyclo-hexyl phenol. Powder 91 and Spray P included pyrethrum, a plant-derived natural insecticide that was obtained primarily from Asia and equatorial Africa and thus was in short supply during the war.⁵ MYL—the formula for which the government would not reveal even to the Louse Lab—was the anti-lice powder used by the U.S. Army.¹¹

On September 1, 1942, the groups received their treatments; six days later the spray group was treated a second time. At the conclusion of the trial, powder 87 "had a perfect record, ridding all men of all lice immediately and keeping them clear for a week;" however, it "was obviously not practical" due to skin and clothing staining and nasal irritation. Powder 94 was equally effective but even more problematic: "It stained the body and stung if inhaled and even produced burning of the scrotum in one case."³¹ Given the side effects of powders 87 and 94, the men who

received those experimental agents were excused from the study.³⁹ Both powders 91 and MYL killed all lice present on the day of treatment and gave evidence of being effective a week later. Indeed, subjects in these groups were reinfested with lice during the study, only to have the insects die. However, both powders had “slight . . . disadvantages”: MYL temporarily irritated the anus of two volunteers, while powder 91 stained skin and clothing and, in one man, caused a temporary redness of the scrotum.³¹ Spray P was the least effective agent.

The third trial commenced September 22, 1942, at which time the weather had turned cold with snow flurries. Twenty-eight men volunteered for the experiment, which ended on October 9, 1942. The men wore long underwear made of 25% wool. The powders tested were 151, 152, 153, 154 (control), 169, MYL, and 180. Davis reported that “no irritation of scrotum, body skin, anus, or excessive sneezing or coughing was observed” that could be attributed to the experimental powders, but “several men had severe dermatitis from the bites of the lice.”⁴⁰ As before, there was staining of clothes and skin.

By early October 1942, the Rockefeller anti-lice studies involving COs had come to the end. Based on the three trials, Davis and Wheeler recommended the use of powders MYL (composition kept secret) and 153 (0.6% 2,4 dinitro-o-cyclo-hexyl phenol, 0.5% pyrethrum concentrate with 20% pyrethrins, and 0.5% n-isobutyl undecylenamide in pyrophyllite dust). The researchers did not think that either MYL or 153 was the ideal lousicide; nevertheless, they were considered “far superior to any of the insecticides similarly used in World War I.”¹⁴ As a follow-up to the New Hampshire trials, Strode and Davis mapped out a plan to conduct an anti-lice field trial in Mexico, and Davis left for Mexico in mid-December.^{41,42}

On choosing to be a subject

The faithfulness of the residents of Camp Liceum in carrying out their research duties was noted by Davis and Wheeler, who wrote:

The cooperation given by the volunteers was remarkable. None gave up the experiment because of its discomforts. None complained, and we believe that none killed lice intentionally. A few men who were severely bothered at night took off their underwear and left it inside their bed, but this made little difference in the counts and is considered insignificant.³¹

Indeed, at the conclusion of the second trial, Davis noted that everyone “seemed very happy and glad to cooperate so that there was no scarcity of volunteers” for the final study.⁴³

It is unclear who was perceived as the primary beneficiary of the anti-lice trials and whether this issue caused any tension among the collaborators. The initial presentation at Camp Campton characterized typhus as a problem of civilian populations.^{27,28} Davis explained to the potential volunteers that any findings would be “restricted to the use of the allied nations during the war” as was “true of all significant scientific research being done today.” But he assured the prospective subjects that “the Rockefeller Foundation [was] . . . primarily interested in international health and its great job in typhus prevention [would] probably come after the war and be carried on irrespective of national boundaries.”²⁸

Despite this framing of the research as primarily humanitarian in nature, sharp distinctions between the Rockefeller Foundation’s research and that done in service of the U.S. war effort were all but impossible during WWII. Some Rockefeller employees simultaneously served in governmental capacities and at least some of the work of the Rockefeller Foundation was closely linked to the objectives and activities of the government. In the case of anti-lice research, Rockefeller researchers worked cooperatively with both the Department of Agriculture (which had received a contract from the National Research Council) and the Surgeon General’s office. Thus, it seems clear that the Rockefeller Foundation was interested in both the humanitarian and military applications of its findings.

But what of the COs who chose to be part of the study? What were their motivations? Who did they perceive as the beneficiary of their participation? The documentary evidence is scant, but what is available suggests a tapestry of concerns. One of the COs who volunteered for the anti-lice trials stated that his participation stemmed from his desire “to do something that would contribute to a better world” and that typhus control efforts were “focused more towards the civilian population that would be involved in the war.”³ Likewise, one volunteer in the anti-lice trials wrote, “Although the sacrifice in terms of time and comfort was not great, the fact that the men were willing and so eager to serve is perhaps indicative of the spirit with which Civilian Public Service will welcome in the future any opportunity to perform a humanitarian work.”³⁵

Another reason for volunteering for the study was a desire to join in the national ethos of service. Unable to serve in the military because of strongly held beliefs, campers frequently wished to prove to themselves, their families, their communities, and the nation at large that they were neither “sissies” nor “shirkers” but rather loyal citizens.⁴ Participating as a research

subject allowed a CO who volunteered for the anti-louse studies to declare, "They also serve who only stand and scratch."³⁵

Among those men who entered CPS, there was a spectrum of how willing individuals were to engage in activities that supported the war. While most COs chose to engage in strictly civilian duties, a few worked in munitions factories and other war-industry labor capacities.⁴⁴ Some campers declared themselves conscientiously unable to perform assignments that raised no such qualms in other campers. One such activity was the harvesting of sugar beets, a controversial assignment because sugar was used in the manufacture of explosives.⁴⁵ Likewise, some "guinea pigging" assignments were more obviously applicable to humanitarian efforts (e.g., the study of starvation), while others were more closely linked to military need (e.g., the trials of anti-malarial agents). Each camper had to decide what his conscience would or would not allow. For instance, Arthur A. Dole wrote that he "had to figure out satisfactory reactions to certain situations: stand for national anthem (yes), buy war bonds (no), pay war taxes (yes), hang out with guys in uniform (sure), volunteer to test diets and extreme heat and cold with results that may benefit our military (yes), express opinion on bombing of Dresden (not unless asked), and so on."⁴⁶

LEGACY OF THE STUDY

Davis's and Wheeler's findings were published in the *American Journal of Hygiene* in March 1944. Already, however, their data had become a mere footnote to history. In January 1943, the Orlando group tested a powder known as DDT.¹¹ First synthesized in 1873, DDT was rediscovered in 1939 by Dr. Paul Müller, who won the Nobel Prize for his discovery and for his demonstrations of the compound's insecticidal properties. In August 1942, Müller's employer, the Swiss company J.R. Geigy, A.G., informed the British and American governments about DDT and its properties.^{47,48} (Due to Swiss neutrality, information about DDT was also made available to the Axis Powers.) Geigy's American subsidiary submitted samples of the substance to the U.S. Department of Agriculture. The DDT was tested with phenomenal results. By May 1943, the Cincinnati Chemical Works, a subsidiary of Geigy, had begun producing DDT for military use.⁵ The Allied Forces quickly embraced DDT, replacing the MYL and AL 63 powders that had been previously used by the American and British Forces, respectively.⁴⁷ MYL was considered "a good insecticide," but with the availability of DDT, MYL was quickly abandoned.⁸

Davis and Wheeler wrote, "The ideal powder must

contain a louse-killing ingredient which is simple, convenient, safe, cheap, and applicable on a large scale."³¹ DDT fit the bill. It killed insects effectively and quickly through nerve poisoning, yet was relatively nontoxic to humans. It was cheap to produce and retained its toxicity for a long period of time, lessening the need for repeat applications. DDT was hailed as a miracle pesticide until the early 1960s, when its negative environmental impact became a matter of public concern.

Today, the contribution of American COs to the testing of anti-louse insecticides intended to prevent typhus is largely unknown. Their role was anything but glamorous, as the COs' contributions to the study were to allow themselves to be infested with lice and then to wear insecticidal powders. The discomfort suffered by the subjects ultimately was for next to naught, given DDT's ascendancy as the insecticide par excellence. On the other hand, the study initiated the use of American COs as research subjects. More than 500 COs eventually participated in more than 40 different experiments sponsored by the Office of Scientific Research and Development and the U.S. Army Surgeon General.³ From May 1941 to April 1947, the span of CPS, COs spent a total of 150,713 man-days in governmentally conducted research.⁴⁹

Campers served as human subjects for a wide variety of experimental protocols, ranging from such topics as the impact of high altitude on the human body to the physiological effects of lying prone during convalescence. Some campers participated in clinical trials of new anti-malarial compounds, while others were exposed to hepatitis and atypical pneumonia in hopes of allowing researchers to identify how these diseases were transmitted. The study that gained the most public attention was the University of Minnesota "semi-starvation experiment" in which campers underwent a period of semi-starvation and then were assigned to different diets to determine which was best for rehabilitation.^{50,51}

CONCLUSION

During the life of the CPS program, COs became a valuable subject population to researchers. Campers were attractive research subjects for several reasons. First, they were in a controlled environment: the CPS camp. Second, some of the campers had sufficient education to serve as research assistants as well as research subjects.^{35,46} Third, campers, having been drafted and found physically eligible for service, were useful proxies for research primarily intended to benefit soldiers.

Another reason why campers were desirable research

subjects was their eagerness to participate. Most campers served their alternative service requirement in nonresearch capacities, but a number volunteered to serve in one or more research studies. The Selective Service concluded that those COs who volunteered for guinea pig assignments “were not afraid to submit themselves bodily to any worthwhile experiment which would result in the saving of life or improvement of health and living conditions.”³

But how voluntary were these men’s decisions? American COs during WWII found themselves in a situation of severely limited choice. A CO’s decision to serve as a research subject was made only after he had already navigated a difficult decision tree encompassing everything from deciding to register for the draft to deciding to join CPS. Along the way, these men sought to balance the demands of their country with their beliefs and values.

In the decades after WWII, the U.S. would undergo a period of national soul-searching with regard to research on humans. Growing public awareness of the volume of research, accompanied by scandals about who such research was conducted on—patients, institutionalized children, minorities, marginalized populations, women, even WWII soldiers—led to a heightened awareness of the ethics of human subjects research. In light of public concern, the U.S. Congress stepped in and, in 1974, created the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (the National Commission), which was charged with developing “guidelines which should be followed in biomedical and behavioral research involving human subjects and to make recommendations to the Secretary of the Department of Health, Education, and Welfare.”⁵² The current system of human subjects research regulation in the United States is largely traceable to the work of the National Commission. Most notably, the National Commission developed the concept of “vulnerable populations,” i.e., the notion that specific groups may be at particular risk of harm or exploitation from involvement in research.

The crucible that gave rise to the National Commission and the current regulatory regime also gave birth to the field of bioethics. The question of coercion and even undue inducement would be central. How should constrained circumstances affect the way we think about the decision to enter into a research project? Is severely limited choice in and of itself coercive, or is there a spectrum of choosing where choice is limited? Given the continued relevance of these issues, it is worth recalling the story of the men who chose to serve

their nation as research subjects rather than perform activities that violated their deepest beliefs.

Alison Bateman-House is a doctoral student in the Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, New York, New York.

The author thanks David Rosner, Ron Bayer, Amy Fairchild, James Colgrove, and Mark House for their comments on drafts of this article; and Dona and Don Robertson for their hospitality during the writing process.

Address correspondence to: Alison Bateman-House, MA, MPH, Center for the History and Ethics of Public Health, Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, 722 West 168th St., New York, NY 10032; e-mail <asb2113@columbia.edu>.

REFERENCES

1. Selective Training and Service Act of 1940; Section 5(g).
2. Keim AN. The CPS story: an illustrated history of Civilian Public Service. Intercourse (PA): Good Books; 1990.
3. Robinson ML. Civilian Public Service during World War II: the dilemmas of conscience and conscription in a free society. Ann Arbor (MI): University Microfilms International Dissertation Information Service; 1992.
4. Anderson RC. Peace was in their hearts: conscientious objectors in World War II. Scottsdale (PA): Herald Press; 1994.
5. Stapleton DH. The short-lived miracle of DDT. *American Heritage of Invention and Technology* 2000;15:34-41.
6. A step in preparedness against typhus [excerpt from Trustees' Confidential Bulletin]. Folder 259, box 32, series 100, Record Group (RG) 1. Sleepy Hollow (NY): Rockefeller Foundation Archives, Rockefeller Archive Center (RAC).
7. Study of typhus fever—authorization and designation. Folder 259, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1940 Mar 18.
8. Busvine JR. Disease transmission by insects. Berlin: Springer-Verlag; 1993.
9. Janney JH Jr. Typhus. Folder 260, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1941 Dec 19.
10. Sawyer WA. Plans for louse control studies in New York. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Feb 11.
11. Stapleton DH. A lost chapter in the early history of DDT: the development of anti-typhus technologies by the Rockefeller Foundation's Louse Laboratory, 1942–1994. *Technology and Culture* 2005;46:513-40.
12. Bauer JH. Delousing studies in New York. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Feb 9.
13. Louse control studies. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Mar 13.
14. Experimental studies in louse control [excerpt from IHD Newsletter October 1942]. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942.
15. Stapleton DH. Lessons of history? Anti-malaria strategies of the International Health Board and the Rockefeller Foundation from the 1920s to the era of DDT. *Public Health Rep* 2004;119:206-15.
16. Sawyer WA. Letter to Dr. Bishopp. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Feb 18.
17. Jackson KT. The Bowery: from residential street to skid row. In: Beard R, editor. *On being homeless: historical perspectives*. New York: Museum of the City of New York; 1987. p. 69-79.
18. Davis WA. Project at 25th Street Municipal Lodging House. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jun 15.
19. Bauer JH. Testing louse repellents. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jun 29.
20. British conchies starve and thirst in experiment seeking way to relieve agony of the shipwrecked. *Newsweek* 1942 Jun 1:56.
21. Mellanby K. *Scabies*. London: Oxford University Press; 1943.

22. French PC. Letter to Dr. Thomas Parran. NARA. Folder 450 Special Projects, General. 1942 Jun 16.
23. French PC. Letter to Col. Lewis F. Kosch. NARA. Folder 450 Special Projects, General. 1942 Jun 16.
24. Strode GK. Letter to Dr. Randall. Folder 261, box 32, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 May 25.
25. Sawyer WA. Letter to Dr. Richards. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Oct 9.
26. Strode GK. Diary excerpt. RG 12.1. Sleepy Hollow (NY): RAC; 1942 Jun 3.
27. Davis WA. Trip to conscientious objectors camp. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jul 6.
28. Swift DE. Letter to George B. Reeves. NARA. Folder 450, N.H. 1942 Jul 7.
29. Strode GK. Letter to General Lewis B. Hershey. NARA. 450 special folder, N.H. 1942 Jul 10.
30. Kosch LF. Letter to Dr. George K. Strode. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jul 6.
31. Davis WA, Wheeler CM. The use of insecticides on men artificially infested with body lice. *Am J Hygiene* 1944;39:163-76.
32. Holmquist HT. Letter to Superintendent Joslyn. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jul 13.
33. Strode GK. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jul 15.
34. Morgan K. Letter to Dr. George K. Strode. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Jul 15.
35. Weightman M. Life in a lyceum. *The Compass: An Instrument of Direction* 1942;1:22-3.
36. Davis WA. Diary excerpt. Box 13, series Davis, William (1942-1943), RG 12.1. Sleepy Hollow (NY): RAC; 1942 Aug 24.
37. Davis WA. Diary excerpt. Box 13, series Davis, William (1942-1943), RG 12.1. Sleepy Hollow (NY): RAC; 1942 Aug 25.
38. Davis WA. Letter to Dr. Sawyer. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Aug 6.
39. Davis WA. Diary excerpt. Box 13, series Davis, William (1942-1943), RG 12.1. Sleepy Hollow (NY): RAC; 1942 Sep 7.
40. Davis WA. Summary of third experiment with louse-killing powders at Glendcliff, N.H. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942.
41. Davis WA. Diary excerpt. Box 13, series Davis, William (1942-1943), RG 12.1. Sleepy Hollow (NY): RAC; 1942 Oct 13.
42. Davis WA. Letter to Colonel Stone. Folder 262, box 33, series 100, RG 1. Sleepy Hollow (NY): RAC; 1942 Dec 15.
43. Davis WA. Diary excerpt. Box 13, series Davis, William (1942-1943), RG 12.1. Sleepy Hollow (NY): RAC; 1942 Sep 11.
44. Schlissel L, editor. *Conscience in America*. New York: E.P. Dutton & Co., Inc.; 1968.
45. Van Dyck HR. *Exercise of conscience*. Buffalo (NY): Prometheus Books; 1990.
46. Dole AA. My war and my peace. In: Gara L, Gara LM, editors. *A few small candles: war resisters of World War II tell their stories*. Kent (OH): Kent State University Press; 1999. p. 53-77.
47. West TF, Campbell GA. *DDT: the synthetic insecticide*. London: Chapman and Hall Ltd.; 1946.
48. Zimmerman OT, Lavine I. *DDT, killer of killers*. Dover (NH): Industrial Research Service; 1948.
49. Selective Service System. *Conscientious objection*. Special monograph 11 1950;1:33-8.
50. Tucker T. *The great starvation experiment: Ancel Keys and the men who starved for science*. Minneapolis: University of Minnesota Press; 2007.
51. Men starve in Minnesota: conscientious objectors volunteer for strict hunger tests to study Europe's food problem. *Life* 1945;19:43-6.
52. National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. *A guide to the collection in the National Reference Center for Bioethics Literature*, Kennedy Institute of Ethics, Georgetown University [cited 2008 Jul 30]. Available from: URL: <http://bioethics.georgetown.edu/nrc/archives/nephsguide.pdf>